Roadway Safety Hardware Management Systems

Save Lives, Time, and Money

U.S. Department of Transportation
Federal Highway Administration

Roadway safety is a serious national public health issue. In 2002, there were 42,815 fatalities and almost 3 million injuries on our Nation's roads. In all, 6 million crashes were reported, costing an estimated financial loss of $230 billion. The U.S. Department of Transportation (DOT) and the American Association of State Highway and Transportation Officials (AASHTO) have created a goal to reduce the fatality rate from 1.5 to 1.0 deaths per 100 million vehicle miles traveled by 2008. It will take a unified array of programs, people, and resources to help the Nation reach this goal. Roadway safety hardware management systems are a key part of the solution.

What are the benefits of a roadway safety hardware management system?

Roadway safety hardware management systems can help State DOTs and other road owners save lives, time, and money. Roadway safety hardware includes signs, pavement markings, guardrails, and other types of safety devices; all are essential for today's highways. Every year, hundreds of millions of dollars are spent installing, repairing, upgrading, and replacing this hardware to insure that it performs as intended.

There are many issues related to managing roadway safety hardware assets. Estimating the life of guardrails, signs, pavement markings, or crash cushions is difficult but essential for predicting future budget needs. Officials struggle with the choice of replacing these items when other construction is planned, or deferring upgrades. Heavy traffic restricts available hours for repair work and increases liabilities on highways. State DOTs cannot risk using a wait-and-see approach to safety hardware maintenance; they need to know what to expect and how to deal with problems strategically before they arise.

What is asset management?

Roadway safety hardware management is part of a State DOT's asset management system. The *Transportation Asset Management Guide* recently adopted by AASHTO defines asset management as "… a strategic approach to managing transportation infrastructure. It focuses on…business processes for resource allocation and utilization with the objective of better decisionmaking based upon quality information and well-defined objectives." All agencies currently are managing individual assets, but not many are taking a comprehensive view or evaluating all the necessary tradeoffs. Estimating the life of an asset is difficult but essential for predicting future budget needs, and for insuring safe and high-quality highways. Management systems can help address these kinds of issues. By using these systems to predict operations and maintenance costs, States can improve the accuracy of their work plans and budgets to replace hardware cost-efficiently and at the appropriate time.

As a first step in a program to research and develop tools that help States manage their vast inventories of roadway safety hardware, AASHTO sponsored a survey of State DOTs to help establish a baseline of current practices, determine needs and interest in enhancements, and identify information on roadway hardware. States provided benefits and in-depth information about their roadway safety hardware management programs, resulting in several case studies. Survey results will be published in a report in the summer of 2004.

Roadway safety hardware components.

A State DOT Case Study: The Road Feature Inventory (RFI)

New Mexico DOT

New Mexico DOT maintains a video-based database on its entire roadway system to facilitate maintenance and limit the State's legal liability. The Road Feature Inventory (RFI) is an application that manages the State's highway assets by collecting information on 31 road feature elements. RFI includes current and past images taken at every 15.25 meters (50 feet) of State road, and additional data associated with each road segment. When fully implemented, State personnel will be equipped with a laptop and a digital camera, and an image will be associated with each new element added to the database.

RFI screen capture.

What the States Are Doing

Minnesota DOT's Automated Facilities Management System allows State districts to order equipment efficiently for lighting, signals, and variable message signs.

Georgia DOT uses the Highway Maintenance Management System to track daily maintenance activities; manage budgets and costs; and track crew time, equipment, and material. The State also uses the Traffic Signal Inventory Program to track inventory and maintenance. The system allows operators to enter maintenance activities, view the data for any problems, retrieve the records, identify the brand of equipment, and dispatch a technician.

Maryland DOT has entered State and local signals into its Signal Database. This management database has many functions, including the ability to retrieve design plans electronically.

Virginia DOT uses a statistically based random sampling management system, Random Condition Assessment (RCA) as an inventory and budgeting tool. RCA includes the condition of selected road sections. It allows the State to extrapolate asset conditions and use the sampling approach to build its inventory. This system costs a fraction of the full inventory system and has allowed the State to implement the system completely in-house.

California DOT (CA DOT) is beginning to use its Integrated Maintenance Management System as an integrated time, material, equipment reporting, and asset inventory system for work performance, including day labor work orders and inventory orders. The software provides the Maintenance Division with access to real-time data, and helps the CA DOT districts monitor and control materials more effectively by improving the accuracy of data that is entered and stored. The software also reduces the amount of time end users spend on administrative tasks, such as recreating information that was collected previously. Other benefits include making it easier to generate reports (because maintenance staff can share data electronically), easing coordination efforts for users that have large projects involving multiple crews, allowing users to determine easily where equipment is located and who is using it, and providing a central repository for information at all levels.

Saving Lives, Time, and Money

Roadway safety hardware management systems vary in scope, integration, and elements managed. States have approached asset management differently, but all aim to improve resource utilization, decisionmaking processes, safety, and system reliability.

For more information on nationwide roadway safety hardware management systems, please contact:

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